

**REMARKS**

Claims 1 through 17, 33 through 37, and 39 through 51 are pending in this application. Claims 5, 6, 7, 8, 9, 33, 34, 42, 43 and 47 are amended in several particulars for purposes of clarity in accordance with current Office policy, to assist the examiner and to expedite compact prosecution of this application. Claims 21 through 32 and 38 have been canceled without prejudice or disclaimer of its subject matter. The Applicant appreciates the Examiner's indication of allowance concerning claims 3, 35-37, 44-46, 48, and 49 and the allowability of claims 33-34 and 47.

**I. Claim Rejections - 35 USC § 112**

The Examiner stated that the specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

The Examiner stated that Claims 5, 7, 8, 9, and 22, are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Examiner states that MPEP 2111.03 states that the transitional phrase, "consisting essentially of," limits the scope of a claim to the specified materials or steps and those that do not materially affect the basic and novel characteristic(s) of the claimed invention. The Examiner further states that a "consisting essentially of" claim occupies a middle ground between closed claims that are written in a "consisting of" format and fully open claims that are drafted in a "comprising" format. The Examiner further states that Claims 5, 7, 8, 9, and 22 recite a "group consisting

essentially of.” The Examiner further states that it is unclear what is included in the respective groups.

The Examiner suggests replacing “group consisting essentially of” with --group consisting of--.

However, here, the relevant inquiry under 35 U.S.C. § 112, second paragraph, is whether the claim language, as it would have been interpreted by one of ordinary skill in the art in light of applicant’s specification and the prior art, sets out and circumscribes a particular area with a reasonable degree of precision and particularity. See *In re Moore*, 439 F.2d 1232, 1235, 169 USPQ 236, 238 (CCPA 1971). Respectfully, The examiner has the burden of explaining why, because of the recited Markush group, appellants’ claims fail to satisfy the above-recited test for definiteness, and the examiner has not carried this burden. Moreover, the use of “group consisting essentially of” is well known and used in patents as for instance since 1976 to today alone, there have been at least 3,320 patents using such language in the claims. It is highly unlikely that so many Examiner’s were incorrect. Such language is used so often because it is definite. Respectfully, the Examiner’s discussion that “consisting essentially of” is a “middle ground” is not relevant to the matter of definiteness and is an inappropriate summarization of the matter.

Therefore, respectfully, the Examiner should withdraw his rejection concerning 35 U.S.C. § 112, second paragraph.

However, for the interest to expedite compact prosecution of this application, claims 5, 7, 8 and 9 have been amended according to the Examiner’s suggestion.

## II. Claim Rejections - 35 USC § 102/103

No claim is anticipated under 35 U.S.C. §102 (b) unless all of the elements are found in exactly the same situation and united in the same way in a single prior art reference. As mentioned in the **MPEP §2131**, “a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Every element must be literally present, arranged as in the claim. *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 9 USPQ2d 1913, 1920 (CAFC 1989). The identical invention must be shown in as complete detail as is contained in the patent claim. *Id.*, “All words in a claim must be considered in judging the patentability of that claim against the prior art.” *In re Wilson*, 424 F.2d 1382, 165 USPQ 494, 496 (CCPA 1970), and MPEP 2143.03.

According to MPEP 706.02(j), the following establishes a *prima facie* case of obviousness under 35 U.S.C. §103:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references

when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

**A. Claims 1-2, 4-6, 21-32, and 42-43 are rejected under 35 U.S.C. 102(e) as being anticipated by and alternatively under 35 U.S.C. 103(a) as being obvious over Yamauchi et al. (US 6,351,061). The Applicant respectfully traverses.**

1. Regarding claims 1-2 and 42-43, the Examiner stated that Yamauchi teaches a cathode comprising a base metal 2 and an electron emissive material layer 3 attached on the base metal 2 (Fig. 1); Yamauchi teaches that the electron emissive material layer 3 includes a surface roughness measured from a distance between a highest point and a lower point of the surface of the electron emissive material layer being at most 15 microns (col. 5, lines 15-19). This range includes the range of not more than 5 microns; and Yamauchi further teaches that if the difference between the highest and lowest point is 10 microns or less that an even better current density distribution can be obtained, anticipating that a cathode having a smaller surface roughness would exhibit even better current density distribution (col. 5, lines 20-22).

a. In the response to the arguments section of 012005, the Examiner further responds by stating that the Examiner agrees that no specific examples falling within the claimed ranges are disclosed.

However, there can be no anticipation under 35USC§102 since the Examiner admits there is no specific examples falling within the claimed ranges in Yamauchi. MPEP §2131.02. On page 19 of Appeal No. 1999-0404, the Board stated that “Chiang does not disclose any one value falling within the range set forth in either claim 2 or 3. Moreover, it is our view that a value falling within the range set forth in claim 2 or claim 3 is not set forth in Chiang with ‘sufficient specificity’ to constitute anticipation.” Furthermore on page 9 of Appeal No. 96-3717, the Board also states, “Lambert does not specifically disclose a range of less than 5 wt% nor does Lambert give an example having a value of less than 5wt%. For this reason alone, we cannot sustain the examiner’s rejection of claims 12, 13, 16-22 and 25-30 under 35USC§102(b) as anticipated by Lambert.”

Therefore, the board has even ruled that since there is no specific value, for the reason alone, they were reluctant on holding an anticipation rejection.

b. The Examiner argues that although the specification of the current application teaches that the range be 8 or less and more preferably 5 or less microns, it does not provide evidence of any unexpected results within the claimed narrower range compared to the range of 10 or less microns. Accordingly, the Examiner argues that the narrower ranges are considered to be disclosed with “sufficient specificity”, therefore, the claimed ranges are anticipated by Yamauchi.

However, unexpected result is more an argument of an obviousness rejection. Therefore, since the Examiner is unable to show any kind of sufficient specificity, then the anticipation rejection cannot be held especially since there is no specific value in the reference falling within the claimed range. To hold otherwise would then go counter to the intention of the 35USC§102 which demands that the exact invention be disclosed in the prior art.

c. Concerning the unexpected result in the 103 rejection, the record does show unexpected results from the claimed ranges.

In paragraph 34 of the present invention, it states, “an oxide cathode layer according to the present invention has a roughness of no greater than 8  $\mu\text{m}$  (micrometers or microns) and preferably no greater than 5  $\mu\text{m}$ , thereby having a uniform and compact surface.” Therefore, such a range gives a uniform and compact surface.

In the subsequent paragraph 35, the present invention refers to the structure with the certain range of roughness by stating:

A cathode for an electron tube having such a structure has compactness 2-3 times better and surface roughness about 4 times better than a conventional cathode. Accordingly, the present invention provides a cathode with a high density and evenness. Consequently, the thickness of an electron emissive material layer can be greatly decreased, the shrinking of a cathode due to a long operation can be prevented, thereby improving a life characteristic and degradation of brightness, and defects caused by a difference between a voltage applied to a cathode and a voltage

applied to a G1 (first grid) electrode can be prevented.

Paragraph 41 of the present invention specifically states:

Further, as seen in FIG. 8, surface roughness of the electron-emissive material layer 110, which is measured as the distance "d" between the highest point 110a and the lowest point 110b on the surface of the electron-emitting material layer 110, is controlled to be no greater than 8  $\mu\text{m}$  (micrometers), or preferably no greater than 5  $\mu\text{m}$ , a variation in the voltage due to a difference in the distance between the cathode and the first grid, is minimized, and shrinkage of the cathode due to a long operating time of the cathode can be reduced. (emphasis added)

Paragraph 56 of the present invention goes on to state, "Moreover, the profile of an electron beam emitted from a cathode material having a relatively lower roughness has the shape of a spherical wave, which increases a beam spot, thereby eliminating a moire phenomenon due to the roughness of a cathode."

Therefore, since there is a showing of criticality of the ranges, not only then is there no specificity under 35USC§102, but the obviousness rejection is overcome.

d. The Examiner goes on to state that since the Yamauchi reference teaches that a difference between the highest and lowest point of not more than 10 microns provides a cathode having a better current density distribution than one having a surface roughness of not more than 15 microns, one of ordinary skill in the art would have found it obvious to provide a surface roughness

less than not more than 10 microns (including not more than 8 and not more than 5 microns).

However, looking at col. 5, lines 15-19, Yamauchi states that not more than 15 microns is favorable and not more than 10 microns is even better, which does not then mean that a lower range is taught or suggested. The Examiner is modifying the taught range and the factual basis for this modification is lacking. As mentioned by the board in Appeal No. 2001-0214 of Application No. 08/826,283, this position, however, is flawed as it does not provide sufficient factual bases for combining the teachings of the applied prior art references to arrive at the claimed composition. *In re Warner*, 379 F.2d 1011, 1017, 154 USPQ 173,177-78 (CCPA 1967), cert. denied, 389 U.S. 1057 (1968), reh'g denied, 390 U.S. 1000 (1968)(the examiner has the initial burden of presenting a sufficient factual basis to support the obviousness of making the claimed combination).

Specifically, the examiner has not demonstrated that Yamauchi teaches the claimed range but makes a conjecture based on his analysis of what one of ordinary skill would do. Nor has the examiner demonstrated that the range taught in Yamauchi is useful for the purpose or utility described in the present invention. Even if the remaining prior art reference teach that merely having a range of less than 10 as alleged by the examiner, that fact alone does not indicate that there is requisite suggestion or motivation to include the range of not more than 8.

e. Moreover, concerning the factual inquiry, Yamauchi teaches a portion of the range of more than 8 through 10 microns roughness being a beneficial maximum roughness, while the present invention clearly does not make such a claim. The Examiner has failed to provide how such portion taught by Yamauchi can be resolved.

The claim as a whole must be considered. See, e.g., *Diamond v. Diehr*, 450 U.S. at 188-89,

209 USPQ at 9, and therefore, one cannot just state then a surface roughness less than not more than 10 microns including 8 and 5 is taught, as this is not a proper conclusion.

Arguing that the range can be modified to be exactly the present invention is improper. The Examiner will have argued only concerning overlapping ranges. However, as shown above, MPEP §2144.05 Obviousness of Ranges, “Applicants can rebut a prima facie case of obviousness based on overlapping ranges by showing the criticality of the claimed range.”

f. It is further arguable that the claims 42 and 43 includes only a maximum value for the roughness rather than a range. It is also arguable that such maximum values are not taught or suggested by Yamauchi. Yamauchi only teaches a maximum of 15 or 10. It is the maximum value that is looked to in such claims and such limitations are not taught or suggested. In surface roughness, as mentioned in the claim, it is the maximum value that is controlled and such maximum value is not taught or suggested.

Moreover, even concerning claims 1 and 2, a maximum range of not more than 8 or not more than 5 is not taught or suggested by Yamauchi. The “maximum” portion of the limitation must be recognized by the Examiner and cannot be summarily discounted. Yamauchi only discloses “not more than 15” and “not more than 10”. Therefore, the only disclosure of a maximum that Yamauchi makes is 10 and 15 and so there is no teaching or suggestion. Yamauchi only teaches that “not more than 10” is better which does not mean the maximum can be modified to a lower amount but merely that the single maximum of 10 is better than 15. Surface roughness varies, but the maximum value

is a certain value that the present invention claims to control. Yamauchi is not teaching that the maximum surface roughness of less than 10 is better but that a maximum of 10 is preferred as it only states the surface roughness of “not more than 10”. Therefore, the maximum value taught by Yamauchi is limited to 10.

g. MPEP 706.02(j) further states that the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). Therefore, controlling or limiting the maximum roughness to 8 or 5 is never taught or suggested as only the maximum of 10 is taught. Yamauchi does not show a reasonable expectation of success of limiting the maximum roughness any further than it could attain. If such was the teaching, then why does not Yamauchi mention a maximum roughness below 10. Well, certainly it is because there is no expectation of success. Lower roughness values maybe attained in the emissive layer, but it is controlling the maximum value that is being claimed.

2. Regarding claim 4, the Examiner stated that Yamauchi teaches that the thickness of the electron emissive material layer is 70 microns (col. 4, lines 45-49). The Examiner states that a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985) (Court held as proper a rejection of a claim directed to an alloy of “having 0.8% nickel, 0.3% molybdenum,

up to 0.1% iron, balance titanium" as obvious over a reference disclosing alloys of 0.75% nickel, 0.25% molybdenum, balance titanium and 0.94% nickel, 0.31% molybdenum, balance titanium.).

Respectfully, this is a highly improper rejection in that Yamauchi fails to teach or suggest the limitation of the claim. the language of *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985) used by the Examiner was never intended to short-circuit the clear wording of 35 U.S.C. §103. A finding of obviousness must be based upon a determination of obviousness under section 103 and not upon a mechanical rule extracted from *Titanium Metals Corp. of America v. Banner*. See *In re Wright*, 343 F.2d 761, 769-770, 145 USPQ 182, 190 (CCPA 1965). It is improper to use *per se* rules to sidestep the fact-intensive inquiry mandated by section 103. See *In re Ochiai*, 71 F.3d 1565, 1570, 37 USPQ2d 1127, 1132 (Fed. Cir. 1995), See also, *Ex parte* Edwin G. Sawdon and Brian D. Petit , decision of the Board of Patent Appeals and Interferences, Patent No. 6,722,842 (Appeal No. 2003-0693, application no. 09/006,248), paper No. 34 , page 7.

It is clear then the Examiner has failed to make *Graham v. John Deere*, 383 U.S. 1, 148 . USPQ 459 (1966), factual inquiries of 35USC§103 as mentioned in MPEP §2141.

3. Regarding claims 5 and 6, the Examiner mentions that the MPEP 2113 states, "The structure implied by the process steps should be considered when assessing the patentability of product-by-process claims over the prior art, especially where the product can only be defined by the process steps by which the product is made, or where the manufacturing process steps would be

expected to impart distinctive structural characteristics to the final product. See, e.g., *In re Garnero*, 412 F.2d 276, 279, 162 USPQ 221, 223 (CCPA 1979) (holding “interbonded by interfusion” to limit structure of the claimed composite and noting that terms such as “welded,” “intermixed,” “ground in place,” “press fitted,” and “etched” are capable of construction as structural limitations.)”

The Examiner further states that MPEP lists process terms and simply states that such terms “are capable of construction as structural limitations.” It is the position of the Examiner that the claimed product can be defined by process steps other than process steps claimed, including the process steps taught by Yamauchi, the claimed manufacturing process steps are not found to impart structural characteristics to the final product different than the final product as disclosed by Yamauchi, while the Examiner agrees that certain process steps may lead to a differently structured final product and in which case are considered patentable, however, the Applicant has not provided teachings to suggest that such a differently structured product, as compared with the product disclosed by Yamauchi, is produced.

However, the application of the present invention does indicate that screen printing and deposition does impart a different structure than for example the spraying of the prior art Yamauchi. In paragraph 8 for example of the present invention, the limitation of spraying causes a limitation in obtaining a uniform and dense coating film which results also in a greater surface coarseness.

Respectfully, as seen in the abstract of Yamauchi, the electron emitting material is sprayed on, which results in the greater maximum roughness of 10 and a maximum roughness of 15 microns. Unlike the spraying of the electron emitting materials, the present invention, on the other

hand, for example in claim 6, uses a screen printing method that is able to control the roughness to a maximum of 8 microns.

Moreover, claims 5 and 6, as amended, also include a maximum of 5 microns roughness and a maximum from 5 to 8 microns which is supported by the present invention specification, but not taught or suggested by Yamacuhi as shown above.

4. The Examiner stated that regarding claims 21-32 and 38, claims, describe compositions that are found only in intermediate products involved with the process of manufacturing the cathode and the claimed compositions are present in the electron emissive paste at the time of application to the base metal but are not found in the electron emissive layer of the final product, and consequently, the claimed compositions are considered to be product-by-process limitations and have not been afforded patentable weight since they are absent in the final product.

a. However, no such law or rule stated in 35USC or 37USC, respectively. In fact intermediate products have been known to be patentable and afforded patentable weight. Moreover, having an intermediate material does not mean that it is a product by process claim. Such a categoric summary judgement is improper and each feature must be actually looked at by the Examiner, which the Examiner has failed to do.

b. Moreover, the claims cannot be summarily rejected by statement stating that all such elements are intermediate products when that is not actually true. There are materials claimed in

claims 21-32 and 38 that are still in the final product and that must be properly addressed. Moreover, if this is a way a composition of a material can be expressed, it is further evidence that it must be looked at for patentability. Respectfully, to categorically avoid such analysis would make the office action incomplete.

However, claims 21-32 and 38 have been canceled without prejudice or disclaimer of its subject matter.

### **III. Allowable Subject Matter**

The Applicant appreciates the allowance of Claims 3, 35-37, 44-46, 48, and 49.

The Examiner stated on page 6 under allowable subject matter and page 1 of the office action summary of paper no. 012005 that Claims 33-34 and 47 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Therefore, claims 33-34 and 47 have been amended according to the Examiner's suggestion to include all of the limitations of the base claim and intervening claims.

Moreover, since claim 3 is allowed, then claims 7 through 9 which depend on claim 3 must also be allowed.

In view of the foregoing amendments and remarks, all claims are deemed to be allowable and this application is believed to be in condition to be passed to issue. If there are any questions, the examiner is asked to contact the applicant's attorney.

A fee of \$600.00 is incurred by this Amendment for the addition of three (3) independent claims above eight (8). Applicant's check drawn to the order of the Commissioner accompanies this Amendment. Should there be a deficiency in payment, or should other fees be incurred, the Commissioner is authorized to charge Deposit Account No. 02-4943 of Applicant's undersigned attorney in the amount of such fees.

Respectfully submitted,

  
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Date: 11 April 2005  
I.D.: REB/SS